

filiform processes amongst the discharged ova of Argonaut, at first, indeed, mistaking them for parasites; and in two specimens of *A. hians*, and in another species, we have taken the hectocotylus from the mantle-sac, in which they lay crossways, overhung by the imperfect septum of that cavity. *Sepiöla*, *Sepia*, and *Loligo*, discharging their ova enveloped in albuminous matter, moulded into different forms, have large albuminiparous glands, answering to those of Gastropods, though more externally situated. The Argonaut has two genital outlets in the female and also in a supposed male specimen, whilst *Octopus* in the male, and the Decapoda in both sexes, have only one.

In the separation of the male gland from its corresponding external organ in some Gastropods to distant parts or extremities of the body (the latter being frequently connected with the right tentacle), in the connexion between the two by means of an internal vas deferens or by an external groove, so often seen, and in the formation of the spermatophore (*Helix*), we are led to conclude that the curious hectocotylus is not quite so isolated and unique a phenomenon as at first appears, but that a synthetical comparison might be made, with more or less success, in this particular, as in others in the Mollusca generally—a comparison which we have endeavoured to make, and such as may be traced, taking other vital organs and functions for comparison (the digestive system for instance, already well described by Cuvier), through the whole of the Invertebrata, and indeed through all animals—enough to show us that no animal has been produced having no relations to the others, or, in other words, upon a different plan to that of its fellows.

XXXVI.—*On the Final Stage in the Development of the Organs of Flight in the Homomorphic Insecta.* By Prof. J. WOOD-MASON, Deputy Superintendent of the Imperial Museum, Calcutta.

“La dernière mue développe subitement les organes du vol dans toute leur étendue par une transformation vraiment merveilleuse et encore inexpliquée, car on ne comprend pas comment des organes aussi volumineux peuvent être renfermés dans les petites gaines où ils se forment pendant la période de nymphe.”—H. DE SAUSSURE, *Mission scientifique au Mexique et dans l'Amérique Centrale, Recherches zoologiques*, vi<sup>e</sup> partie, 1<sup>e</sup> sect., *Études sur les Orthoptères*, 1872, p. 224.

WHEN an insect quits the egg it has no wings, nor the slightest rudiments of such, these making their first appear-

ance at one of the earlier changes of skin as slight prolongations of the posterior angles of the dorsal arcs of the two hindermost divisions of the thorax, the mesothorax and the metathorax. These prolongations are so many duplicatures or flattened evolutions of the integument—the chitinous membrane that covers them above and below and on the edges being in direct continuity with that which covers the insect's body, being, in fact, part of it, and the intermediate cellular layer which produces this chitinous membrane being similarly continuous with that which underlies the skin of the rest of the insect's body. They increase in size slightly at each successive moult, soon acquiring a definite triangular form and the principal nervure dividing the wing into its two principal areae; but, relatively to the future wings, they are small and insignificant even at the last moult, at which the organs of flight are suddenly developed to their fullest extent. If a wing-rudiment be examined just prior to a change of skin, it is found that its external chitinous covering has separated off so as to be easily detachable from a new wing-rudiment that has formed beneath it, and that this new wing-rudiment lies quite flat within its sheath (as the portion of the chitinous external layer which covers it may be called after its detachment). The new wing-rudiments are found to lie similarly flat within their sheaths at every change of skin down to and including the last but one, into the interval between which and the last it is that the growth of the wings from small and insignificant rudiments to their full extent is compressed. The penultimate change of skin accomplished, new wing-rudiments are produced in due course from the cellular layer; and at the time when their sheaths first become detachable from them they, like all their predecessors, lie extended quite flat within these sheaths; but the detachment of these is no sooner completed than they\* commence to grow with great rapidity. The first outward and visible signs of the growth that now ensues are the thickening of the prolongations (which up to this time were thin plates with thin and sharp edges closely embracing the insect's body, but which now gradually become biconvex masses with thick and blunt edges standing out from it) and the gradual obliteration of the principal nervure. The walls of the sheaths eventually become distended to such a high degree of tenuity and consequent transparency under the enormous pressure thrown upon them by the rapidly growing wings, that it is possible to see, even without dissection, the manner in which these are forced

\* *I. e.* the wing-rudiments.

to arrange themselves in so limited a space: it can be clearly seen that the wings have thrown themselves into a multiplicity of closely packed transverse folds, representing increments of growth in length, and that these, again, have disposed themselves, in groups, in wavy (longitudinal) folds representing growth in breadth; so that the wings, plaited and folded up in this complex manner, present a superficial resemblance to the surface of a much-convoluted brain or to a portion of a transverse section of a Labyrinthodont tooth.

This mode of development of the wings obtains in all Orthopterous insects, upon larvæ of which these observations are mainly based—at least in some Neuroptera (*Termes*), and probably universally in the groups which Westwood, years ago, collectively termed the Homomorphic Insecta.

XXXVII.—*Note on the "Tubulations Sableuses" of the Étage Bruxellien in the Environs of Brussels.* By H. J. CARTER, F.R.S. &c.

[Plate XVIII.]

IN the 'Annales de la Société Malacologique de Belgique,' t. ix. pl. iii. 1874, M. A. Rutot published an excellent paper on the "Grès Fistuleux et Tubulations Sableuses de l'étage Bruxellien" in the environs of Brussels, chiefly dwelling on the fossil sponge-spicules found about them; and thus attention has been directed to these interesting objects, which otherwise might have remained in abeyance for an indefinite period.

Knowing the interest which I have taken in the Spongida both recent and fossil, my kind friend M. Ernest Vanden Broeck, of Brussels, obtained from M. Rutot a copy of his paper, and, together with some of the sand containing the sponge-spicules, forwarded the same to me in April 1876, following it (as I had expressed an opinion somewhat different from the conclusions to which M. Rutot had arrived) by a box containing several specimens of the "tubulations sableuses" themselves, for my examination.

These specimens, which were preceded by a letter and sketches from M. Vanden Broeck explanatory of the contents of the box &c., reached me in August 1876; and having had many engagements to fulfil since then, my examination of them has necessarily been postponed to the present time (Feb. 1877).

There are eighteen specimens of the "tubulations," with